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### Liner for an impression holder

This invention relates to a liner for prosthetics impression holders, particularly, but not exclusively for dental impression trays.

5       At present, dental impression trays require the application of an adhesive substance (by means of a spray or brush and bottle) onto the fitting surface of a prior U-shaped trough for location on said surface of an impression material and after use, when the impressed material has been removed, the tray has to be cleaned and any remnant of the impression material removed. A disadvantage of this procedure is that cleaning and removal of material can be time consuming and often results in discolouration of the tray. Further, a discoloured tray can often be repellant to a patient.

15       An object of this invention is to obviate or mitigate the aforesaid disadvantage.

20       Once the dental impression has been taken, the tray, with the impressed material still on it, is often located in a sealed bag in order to prevent moisture loss from the impressed material. In so doing the handle at the front end of the tray by which the dentist holds the tray while making the dental impression, is also enclosed in the bag and the tray cannot therefore be hung from a peg via a slot provided in the handle for that purpose.

25       Another object of this invention is to obviate or mitigate this further disadvantage.

30       According to one aspect of the present invention there is provided a liner for prosthetics impression holders, said liner having areas on each side for securing location of the liner to the fitting surface of the holder and for securing location on an impression material on the liner.

35       According to another aspect of the present invention there is provided a liner for prosthetics impression

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holders, said liner having areas on each side for securing location of the liner to the fitting surface of the holder and for securing location on an impression material on the liner and having means for enclosing the impressed material in a substantially airtight manner while still on the holder.

Preferably, the area of the liner on at least the face for location to the fitting surface of the shoulder is coated with an adhesive, and preferably, such adhesive is a tack peelable adhesive

Preferably also, the area of the liner on the face for securing the impression material has means to secure the impression material by micro mechanical bonding and/or chemical inter-reaction.

Preferably also, a surface which provides for micro mechanical bonding is a fabric.

Preferably also, said means for enclosing the impressed material comprises at least one flap portion which, after the material has been impressed, is foldable over the material to form a closure within which the material is contained.

Preferably, at least one flap portion has an adhesive area for securing the liner in the enclosed condition.

Alternatively, said enclosure means is a bag member which is attached to or incorporates the areas for attachment to the holder and for receiving the impressed material, said bag member being closeable over the impressed material.

Preferably said bag when closed can contain therein a quantity of fluid adapted to treat the impressed material.

The adhesive coating to secure the liner to the holder preferably incorporates or is treated with a medium which enables the liner as it is being applied to the holder to be slidably adjusted into correct position thereon before the adhesive properties prevent further movement.

Said medium may be an organic solvent such as

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turpentine and may be applied during manufacture or prior to application of the liner to the holder.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a plan view of a liner for a prosthetics impression holder according to the invention in the form of a dental impression tray;

Fig. 2 is a plan view of an upper dental impression tray with a folded liner therein to a different scale;

Fig. 3 is a side elevation of Fig. 2;

Fig. 4 is a plan view of a lower dental impression tray with a liner therein;

Fig. 5 is a plan view of a liner in the form of a reversible bag; and

Fig. 6 is a plan view of a basic liner illustrating modified securing means.

Referring firstly to Figs. 1 to 4 the impression holder, in the form of an upper dental impression tray shown in Fig. 2 comprises a fitting surface formed by a base 11 having a U-shaped trough portion 12, a central raised 'pallet' portion 13 and a rim 14 defining the outer edge of the trough; also a handle 15 at the base of the U-shaped rim, i.e. at the front end of the tray by which the dentist holds the tray when making the dental impression.

A second tray 16 shown in Fig. 4 is a lower dental impression tray in which the fitting surface is a trough 19 which is U-shaped and has outer and inner rims 17. The tray 16 has an inner open area 20 to accommodate the patient's tongue during use, and a handle 21.

Referring to Figs. 1 to 3, the Liner 25 of this embodiment comprises a piece of non-stretch or pre-stretched material, e.g. polythene sheeting approximately 9" wide by 7" long. It has an area 26 on its underside as viewed in Fig. 1 (and shown in chain lines) by which the liner can

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be secured to the fitting surface 11 to 14 of the holder and an area 27 on its upper side, overlying the lower area by which a supply of impression material can be secured to the liner. The impression material may be a  
5 rubber or rubber based material or an alginate. The lower securing area 26 is, in this embodiment substantially D-shaped as shown in Fig. 1 to engage the fitting surface of the tray including the inner sides of the rim, but it may be substantially U-shaped to engage only the sides  
10 14 and trough portion 12. The upper securing area 27 in this embodiment is also substantially D-shaped to engage the impression material which fills the fitting surface of the tray.

The securing areas 26, 27 of the liner 25 are, in  
15 this embodiment, coated with adhesive such as a tack-peelable adhesive and the lower area 26 is covered, prior to use, by a peelable cover 26'.

The upper area 27 may also be similarly covered. However, it has been found that, while a rubber or rubber  
20 based impression material adheres to an adhesive surface, alginates do not readily do so. Therefore, the upper adhesive coating 27 is covered by a fabric material 27' which keys the impression material to the liner by a micro-mechanical bonding solely or in addition to a  
25 chemical interaction with the adhesive coating or with the material of the fabric. The fabric may be of natural or man made fibres or a plastics material. One suitable fabric is a polyamide fabric such as is produced in the manufacture of stockings and tights.

30 Preparatory to use, the liner 25 is positioned on the tray 10 such that a large portion 25A extends forwards over and beyond the handle end of the tray; afterwards that portion is folded over the tray as hereinafter described and shown in Fig. 2. Side portions 25B of the liner  
35 extend beyond the sides of the tray. A portion of the

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Liner may extend beyond the back of the tray, but is preferably in line therewith and narrow strip of adhesive 28 extends along the front edge of the liner on the upper face thereof, covered by peel-off cover strip.

5 Preferably, adhesive strips 28A are also provided on the upper side edges and at least one edge strip 28B on the lower side for the purpose referred to hereinafter.

10 A tab 29 is attached to the underside of the liner 25 on the portion 25A which is intended to fold over the impressed material.

Before the liner is secured to the tray the patient's details are recorded on the tab 29 and those details will then remain attached to the closure containing the impressed material, thus eliminating possible errors in

15 identification.

Once the lower adhesive cover 26' has been peeled off the liner is firmly adhered to the fitting surface of the tray (by finger pressure) with overlapping portions at the sides, front and rear.

20 To allow for adjustability when fitting the liner 25 to the tray, the surface of the tray or the exposed adhesive portion 26 is brushed with a solvent, such as turpentine. This has the effect of allowing the liner to slide on the surface for about 30 seconds after which the spirit

25 evaporates and the adhesive properties securely hold the liner in position. Alternatively and preferably, the adhesive portion is treated during manufacture before it is covered by its cover portion with a solvent which will remain effective for a sufficient period of time

30 between manufacture and use. Such a solvent may be a heavy derivative of petrol, e.g. turpentine or paraffin.

The upper adhesive cover (if provided) is then peeled off and the impression material 30 placed on the adhesive or fabric surface to cover the fitting surface of the tray

35 up to the level of the rim.

With the overlapping portions of the liner tucked

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under the bottom of the tray, the dentist then inserts the tray rearwards into the patient's mouth and makes the dental impression; when the tray has been removed from the patient's mouth, the impressed material is covered to prevent loss of moisture. This is done by peeling off the cover strip from the marginal adhesive strip 28, then folding the front portion of the liner over the impressed material, tucking the edge under the rear end of the tray and securing the tucked edge by its adhesive strip 28. The side edges of the folded liner are also secured together by their adhesive strips 28A (if provided). The side flaps formed by the folded side portions are then also tucked under the tray and if the outer tuck has an adhesive strip 28B the folded liner is securely closed thereby. Alternatively, a piece of adhesive tape can be used to secure the folded liner.

Alternatively, the overlapping portions of the liner may be gathered under the underside of the tray and secured by, for example, an adhesive strip on one of the portions.

The liner used with the lower impression tray 16 of Fig. 4 is modified to take account of the open area 20 between the U-shaped trough 19; this can be done by cutting out of portion of the liner at 31 before or after it has been secured to the trough of the tray, or simply cutting a slot 32 so that the patient's tongue can push the liner aside when the tray is inserted (upside down) into the patient's mouth.

Thus, the impressed material 30 is enclosed in a substantially airtight closure while the handle 15, 21 is outside the enclosure and can be used for hanging the filled tray pending further processing, e.g. dipping and casting. During the casting process the liner prevents adherence of casting material to the edges of



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the tray.

After a cast has been made, the liner, together with the impressed material, can be peeled off the tray and cleaned or sterilized before re-use. However, in many instances the casts are made remote from the premises where the impression was taken; in which cases, empty trays are subsequently returned, but these are often simply the same number of trays as received and not necessarily the actual trays that were dispatched; often too less trays are returned than dispatched. Therefore the dentist's name and address can be provided on the liner so that the tray, complete with its liner and impressed material, can be returned to the correct address.

The peel-off cover over the or each adhesive portion 26, 27 may be perforated for selective removal of all or a portion of the covers according to the size of the dental tray; thus one standard size of liner could be produced for use with the various sizes of impression trays.

Liners having adhesive areas on both sides may be packaged in layers such that removal of the upper liner effectively removes the peelable cover from the underside of the removed liner. This can be achieved by using one cover portion for the adjacent adhesive portions of adjacent liners, the peelable strength of the upper adhesive being less than that of the lower adhesive so that the cover remains on the lower liner.

A second embodiment will now be described with reference to Fig. 5 which is a plan view of a liner in the form of a flat reversible bag 39.

The bag has two flat walls 40, 41, is open at one end and may be of any suitable shape. In this embodiment it has a substantially key-hole shape with the opening at the end towards which the sides 42 diverge.

At the closed end 43 of the bag, but spaced a short distance of e.g. 1 inch, from the edge is a D - or C -

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shaped adhesive portion 44, 45 on both sides of one wall. As in the previous embodiment each adhesive portion may be covered by a peel off protective cover, but preferably one portion 44 is covered by a peel off cover 46 while the other portion 45 is covered by a fabric material 47. These portions 44, 45 curve towards the open end of the bag. In use, the trough 48 of the tray 49 is adhered to one side of wall 40 and the impression material is adhered to the other side.

In a preferred arrangement the outer cover 46 is removed and the outer adhesive portion 44 secured by finger pressure to the tray 49 the tray being disposed with its heel or back 50 spaced 1 inch from the closed end of the bag. The front of the tray or handle 51 extends towards the open end of the bag.

With one hand inside the bag to press the bag wall against the trough 48, the bag is then drawn inside out so that the fabric covered portion 45, 47 is exposed. The impression material (not shown) is then placed in the trough and adhered to the (previously inner) fabric portion 45, 47.

With the material of the bag gathered about the handle 51 the dental impression can be made, after which the bag is drawn back to its original mode, thus locating the impressed material within the bag but with the handle 51 outside the bag. At this stage a sterilizing or other liquid can be introduced into the bag either directly or in a sponge or other retaining means and open end can then be sealed, e.g. by adhesive strip of plastic bead closure.

A label 52 is attached to the outer face of the bag liner to carry details of the patient and the dental surgeon. These details are written on the label before use of the liner.

In an alternative arrangement, not shown the tray is firstly located inside the bag and the trough adhered to

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the inside adhesive portion which in this arrangement is covered by a peel off cover but this will require easy removal of the inner peel off cover and prevention of the inner faces of the bag sticking together.

5        Once the tray has been adhered to the inside of the bag, the outer cover, if provided can be peeled off and the impression material can be located in the liner trough. Preferably, however, the outer adhesive portion in this arrangement is covered by a fabric material.

10       On completion of the impression, the bag is then folded inside out to draw the open end over the tray and after adding sterilizing fluid if desired, the opening can be sealed so that the impressed material is within the closed bag but the handle is outside.

15       Prior to further processing the tray of either above arrangement can be hung up via a slot 53 in the handle 51. When the cast is to be made, the bag is unsealed and the impressed material uncovered. However, as the tray is still covered by the liner it is protected against contamination from the material from which the cast is made.

20       An alternative liner for the modified arrangement described above comprises the bag liner in the form of a pouch, i.e. with one wall shortened for example to line X - X of Fig. 5. This allows easy removal of the peel off cover 46 within the pouch and location of the tray therein with subsequent location of the impression material on the outside face of the pouch. On completion of the impression, the longer wall of the pouch can be folded over the impressed material and secured.

25       As an alternative to coating a liner of Figs. 1 to 5 with adhesive on both sides and covering one side with a fabric, the liner, e.g. liner 25 may have one or more cut out portions (26) so that during manufacture a self adhesive backed fabric (27) can be secured to one side of the liner with adhesive portions over the or each cut

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out portion 26. These portions can then be treated with a solvent if desired and/or covered by a peel-off cover 26'.

In a third embodiment, Fig. 6 a liner 60 is provided simply to provide a barrier between the tray and the impression material.

The liner is for example formed of a fabric such as a polyamide fabric coated on one side with an adhesive 61 such as a tack-peelable adhesive which is covered by a peelable cover 62 prior to use. Preferably a tab portion 63 is provided to extend beyond the tray when the liner is secured thereto for easy removal of the liner after use. The tab 63 may be for example at the handle end of the liner, as illustrated in Fig. 6.

The adhesive coating 61 may be over the whole area which engages the surface of the tray or it may be on selected areas only. For example, as illustrated in Fig. 6 in order to prevent the adhesive surface prematurely adhering to the rim of the dental impression tray, in this instance, an upper tray, the D shaped adhesive portion 61 is smaller than the dimensions of the fitting surface which in this embodiment correspond with the dimensions of the liner. Separate arcuate strips 61' are spaced from the D-shaped portion 61 so that, once the D-shaped portion 61 has been correctly positioned, the arcuate strips 61' can be secured to the rim of the tray. This arrangement is an alternative to the use of a solvent to allow the liner to be momentarily slid into the correct position. Fabric surface 64 secures the material 30.

As an alternative to coating the fabric with an adhesive, the liner may be manufactured from an adhesive coated fabric 64 and a backing 60 which has cut out portions 61, 61' equivalent to the coated area or areas. The fabric can then be adhered to a backing so that the

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adhesive surface is covered by the cut out portions and these can be covered by a peelable cover.

5 A liner as described with reference to Fig. 6, i.e. one having no means for enclosing the impressed material may be enclosed in a known bag or it may be attached to a sheet or bag in which it can be enclosed after the impression has been made. However, the main purpose of this liner is to protect the tray from the impression material by forming a barrier between the two and it has  
10 the following advantages:

- 1) Connects impression more firmly to tray than other methods,
- 2) Is quick and clean to use,
- 3) Avoids the use of messy spray on or brush on glues,
- 15 4) Old stock trays can now be used pleasantly and hygienically - (expensive disposables no longer required).
- 5) Trays cleaned off rapidly like new.

The liners as hereinbefore described with reference  
20 to Figs. 1 to 5 have these and additional advantages, namely:

- 6) Protects impression from moisture loss,
- 7) Tray can be prepared ready for impression before session starts with name, moisture sealant and adhesive,
- 25 8) Provides a further barrier between patient's body fluids and dentist giving complete protection for technicians,
- 9) Facilitates impression identifications,
- 10) Handle remains exposed allowing easy storage awaiting collection or processing.
- 30 11) Tray remains identified up to point of return (no more lost trays)..

The liner, described with reference to dental trays, can be adapted for use with other holders when the aforesaid  
35 advantages accrue, e.g. impression holders for making optical impressions for the production of contact lenses, and in production of artificial limbs and joints.

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CLAIMS.

1. A liner for prosthetics impression holders characterised in that said liner (25) has areas (26, 27) on each side for securing location of the liner (25) to the fitting surface (11-14) of the holder (10, 16) and for securing location on an impression material (30) on the liner.
2. A liner for prosthetics impression holders characterised in that said liner (25) has areas (26, 27) on each side for securing location of the liner (25) to the fitting surface (11, 14) of the holder (10, 16) and for securing location on an impression material (30) on the liner and having means (25B, 40/41) for enclosing the impressed material (30) in a substantially airtight manner while still on the holder (10, 16).
3. A liner according to claim 1 or 2 characterised in that the area (26) of the liner on at least the face for location to the fitting surface (11, 14) of the holder (10, 16) is coated with an adhesive.
4. A liner according to claim 3 characterised in that such adhesive is a tack peelable adhesive.
5. A liner according to any one of claims 1 to 4 characterised in that the area (27) of the liner on the face for securing the impression material has means (27') to secure the impression material by micro mechanical bonding and/or chemical inter-reaction.
6. A liner according to claim 5 characterised in that the means (27') which provides for micro mechanical bonding is a fabric.
7. A liner according to any one of items 2 to 6 characterised in that said means for enclosing the impressed material (30) comprises at least one flap portion (25A) which, after the material has been impressed, is foldable over the material (30) to form a closure within which the material (30) is contained.
8. A liner according to claim 7 characterised in that at least one flap portion 25A has an adhesive area (28)

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for securing the liner (25) in the enclosed condition.

9. A liner according to any one of claims 2 to 6 characterised in that said enclosure means is a bag member (39) which is attached to or incorporates the areas (26, 27) for attachment to the holder (10, 16) and for receiving the impressed material (30), said bag member being closeable over the impressed material.

10. A liner according to claim 9 characterised in that said bag (39) when closed can contain therein a quantity of fluid adapted to treat the impressed material.

11. A liner according to any one of claims 3 to 10 characterised in that the adhesive coating to secure the liner (25) to the holder (10, 16) incorporates or is treated with a medium which enables the liner (25) as it is being applied to the holder to be slidably adjusted into correct position thereon before the adhesive properties prevent further movement.

12. A liner according to claim 11 characterised in that said medium is an organic solvent such as turpentine.

13. A liner according to claim 11 or 12, characterised in that the medium is applied to the adhesive surface (26) during manufacture and is retained active under a cover (26') which covers the adhesive surface (26) prior to use.

14. A liner according to claim 1 characterised in that it is formed by securing an adhesive coated member to a backing which has one or more cut out portions to that the adhesive coating is exposed by the or each cut out portion.

15. A liner according to any one of claims 2 to 13, characterised in that it is formed by providing at least one cut out portion (26) in the liner (25) and attaching to one side of the liner an adhesive coated member (27) so that the adhesive coating is exposed by said cut-out portions.

16. A liner according to claim 14 or 15, characterised in that the adhesive coated member is a fabric to secure the impression material to the liner.





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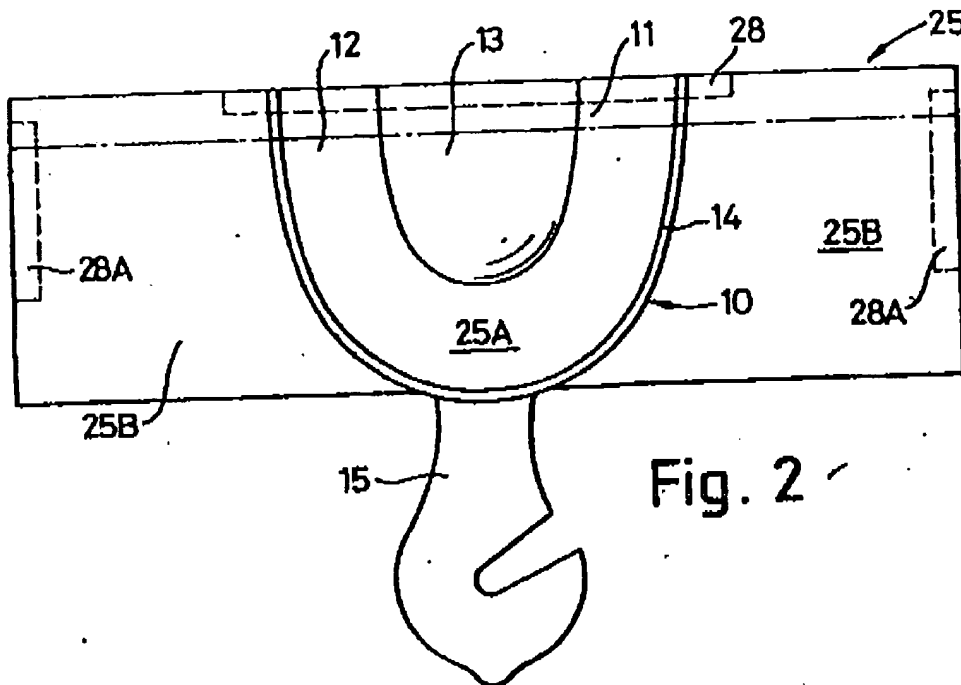


Fig. 2

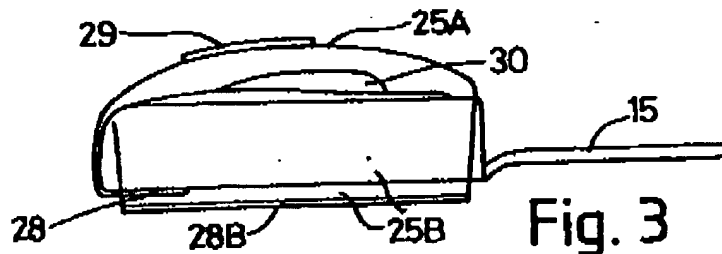


Fig. 3

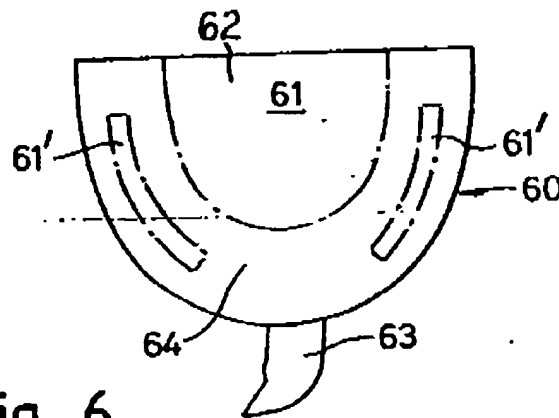


Fig. 6

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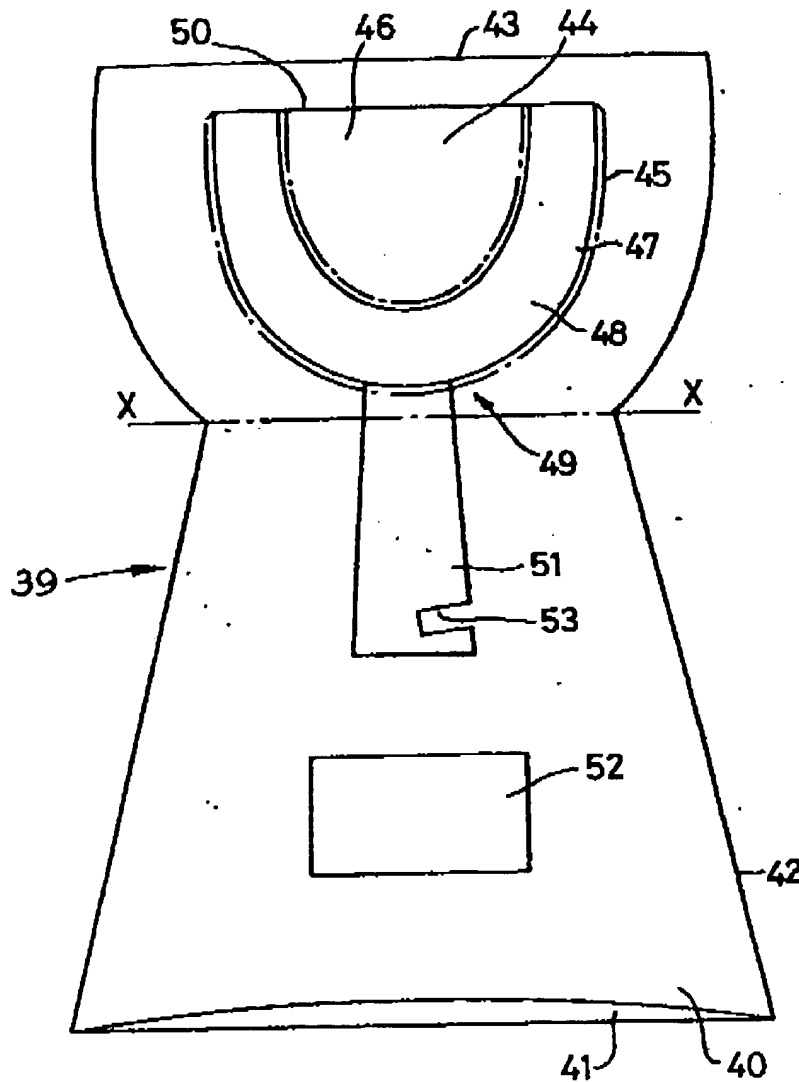


Fig. 5

SUBSTITUTE SHEET

## INTERNATIONAL SEARCH REPORT

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|   |  |
|---|--|
| International Application No.   |  |
| I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *   |  |
| According to International Patent Classification (IPC) or to both National Classification and IPC   |  |
| IPC <sup>4</sup> :  | A 61 C 9/00  |
| II. FIELDS SEARCHED   |  |
| Minimum Documentation Searched <sup>7</sup>   |  |
| Classification System   | Classification Symbols   |
| IPC <sup>4</sup>  | A 61 C   |
| Documentation Searched other than Minimum Documentation<br>to the extent that such Documents are included in the Fields Searched <sup>8</sup>   |  |
| III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup>   |  |
| Category *  | Citation of Document, <sup>10</sup> with indication, where appropriate, of the relevant passages <sup>11</sup> |
| A   | US, A, 4530662 (ANDERSSON et al.)<br>23 July 1985,<br>see the whole document                                   |
| A   | GB, A, 415264 (KALVIN) 13 September 1934   |
| A   | DE, A, 2500325 (REHBERG) 8 July 1976   |
| A   | US, A, 3302289 (SPAULDING) 7 February 1967,<br>see figures 1,4   |
| <p>* Special categories of cited documents: -</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another claim or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Z" document member of the same patent family</p> |  |
| IV. CERTIFICATION   |  |
| Date of the Actual Completion of the International Search   | Date of Mailing of this International Search Report  |
| 31st May 1988   | 12.07.88   |
| International Searching Authority   | Signature of Authorizing Officer   |
| EUROPEAN PATENT OFFICE  | P.C.G. VAN DER PUTTEN  |

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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 13/06/88.  
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| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------------------|----------------------------|---------------------|
| US-A- 4530662                             | 23-07-85            | None                       |                     |
| GB-A- 415264                              |                     | None                       |                     |
| DE-A- 2500325                             | 08-07-76            | None                       |                     |
| US-A- 3302289                             |                     | None                       |                     |

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